[002] This application is a national stage completion of PCT/EP 2003/010276 filed September 16. 200 which claims priority from German Application Serial No. 102 44 026.3 filed September 21, 2002.

[003] FIELD OF THE INVENTION

[005] BACKGROUND OF THE INVENTION

[015] SUMMARY OF THE INVENTION

[034] BRIEF DESCRIPTION OF THE DRAWINGS

[035] ~~The control and regulation method of the invention as well as the device for implementing this method can best be explained with the aid of an exemplary embodiment of the invention. A drawing is appended to the description for this in whose sole figure the drive train of a motor vehicle as well as a large number of variants of the device of the invention are represented in schematic representation.~~ The invention will now be described, by way of example, with reference to the accompanying drawings in which:

[036] Fig. 1 is a schematic representation of a drive train of a motor vehicle as well as a large number of variants of the device of the invention.

[037] DETAILED DESCRIPTION OF THE INVENTION

[040] Finally, this Figure illustrates a motor vehicle seat 37 as a final motor vehicle main component on which a motor vehicle occupant can perceive vibrations in the motor vehicle. The motor vehicle seat 37 is physically fastened on the motor vehicle floor 40 via a spring damping system, which is here indicated by a spring 38 and a damping piston 39, for transmission of the vibrations generated by the drive train in this simplified representation.

1-21. (CANCELED)

22. A method for reducing disturbing vibrations in a motor vehicle in which the disturbing vibrations are determined by a control and regulating device using suitable sensors, at least one device is activated when previously established limiting values are exceeded by the control and regulating device such that an amplitude of the disturbing motion is completely eliminated or at least damped, the at least one device acts in at least one rotating component in a motor vehicle drive train such that a latter component or components are continuously or periodically braked in rotary motion when the disturbing vibrations occur or are excited to a compensatory vibration.

23. The method according to claim 22, further comprising the steps of the compensatory vibration or brake intervention has a same or a similar frequency as the disturbing vibration, but has a phase offset in relation to the disturbing vibration that leads to a reduction in amplitude of the disturbing vibration.

24. The method according to claim 22, further comprising the steps of one of a starting or gear box in the drive train is actuated by the control and regulating device such that torque transmission capacity oscillates with the frequency of the disturbing vibration and has a phase offset in relation to the disturbing vibration through which the amplitude of the disturbing vibration is reduced to a predetermined value.

25. The method according to claim 22, further comprising the steps of a service brake acting on an input shaft of the drive train is actuated by the control and regulating device such that with a rise in the vibration amplitude of the disturbing vibration, the service brake brakes the transmission input shaft to a rotational speed that reduces the amplitude of the disturbing vibration to a predetermined value.

26. The method according to claim 22, further comprising the steps of an abrasion-free permanent brake arranged according to drive engineering behind a transmission is actuated by the control and regulating device such that with a rise in the vibration amplitude of the disturbing vibration, the permanent brake brakes a rotational speed of wheel drive shafts such that the amplitude of the disturbing longitudinal oscillation is reduced to a predetermined value.

27. The method according to claim 22, further comprising the steps of service brakes are actuated on driven motor vehicle wheels by the control and regulating device such that with a rise in the vibration amplitude of the disturbing vibration, the driven

motor vehicle wheels are braked to a rotational speed via which the amplitude of the disturbing vibration is reduced to a predetermined value.

28. The method according to claim 22, further comprising the steps of a motor vehicle internal combustion engine is actuated by the control and regulating device such that a rotational speed of the internal combustion engine oscillates with a frequency of the disturbing vibration, but has a phase offset in relation to the frequency of the disturbing vibrations through which the amplitude of the disturbing vibration is reduced to a predetermined value.

29. The method according to claim 28, further comprising the steps of the control and regulating device increases a switching rotational speed during a switching travel recognized by this, preferably an idling rotational speed of the internal combustion engine, such that the amplitude of the disturbing vibration is reduced to the predetermined value.

30. The method according to claim 29, further comprising the steps of the switching rotational speed of the internal combustion engine is increased step by step until the amplitude of the disturbing vibration is reduced to the predetermined value.

31. The method according to claim 22, further comprising the steps of with a double clutch transmission, a second clutch is activated with respect to torque transmission capacity in addition to a first clutch, which is closed for a shifted step, so far and as frequently and with such a vibration phase offset in relation to the disturbing vibration until an amplitude of the disturbing vibration is reduced to a predetermined value.

32. The method according to claim 22, further comprising the steps of a synchronization device for a not shifted transmission step is activated in connection with a gear box so far, as frequently and with such a vibration phase offset until the amplitude of the disturbing vibration is reduced to a predetermined value.

33. The method according to claim 22, further comprising the steps of the control and regulating device records rotational speeds of a clutch input side and a clutch output side with aid of rotational speed sensors, and motor vehicle acceleration can be ascertained by the control and regulating device with aid of a sensor unit that recognizes longitudinal acceleration.

34. A device for reducing disturbing vibrations in a drive train and in a motor vehicle in which the disturbing vibrations are determined by a control and regulating

device which is connected with one or more of rotational speed sensors (34, 36) and vibration sensors (41) via sensor leads (32, 33, 35), for a purpose of recording the disturbing vibration, the control and regulating device is connected through signal engineering via control leads (25, 26, 27, 28, 29, 30, 31) with devices (7, 11, 15, 21, 22, 23), the control and regulating device being activated when previously established limiting values are exceeded by the control and regulating device such that the disturbing motion is completely eliminated or at least damped in amplitude, the device acts in at least one rotating component in the drive train such that latter component or components are continuously or periodically brought into vibration or braked in rotary motion when the disturbing vibrations occur or are excited to a compensatory vibration causing one or more of a vibration frequency, vibration amplitude and vibration phase angle to be constructed in relation to the one or more of a frequency, amplitude and vibration phase angle of the disturbing vibration causing a damping of the amplitude of the disturbing vibration with a superposition with the disturbing vibration.

35. The device according to claim 34, wherein the rotational speed of one of the input side (5) or the output side (6) of a clutch (4), preferably one of a starting or gearbox, can be recorded with the rotational speed sensors (34, 36).

36. The device according to claim 34, wherein a disturbing motor vehicle longitudinal oscillation, preferably in a region of a motor vehicle seat (37), can be recorded with the vibration sensor (41).

37. The device according to claim 34, wherein the control and regulating device (24) is connected to an actuating device (7) for activating a clutch (4) via a control line (31).

38. The device according to claim 34, wherein the control and regulating device (24) is connected to an actuating device (15) for activating a synchronization device (10) in a gear box (8) through a control line (27).

39. The device according to claim 34, wherein the control and regulating device (24) is connected to a service brake (11) for braking a transmission input shaft (3) of a gear box (8) through a control line (26).

40. The device according to claim 34, wherein the control and regulating device (24) is connected to an abrasion-resistant permanent brake (23) for braking motor vehicle drive shafts (18) through a control line (28).

41. The device according to claim 34, wherein the control and regulating device (24) is connected to service brakes (21, 22) on driven motor vehicle wheels (19, 20) via control lines (28, 29).

42. The device according to claim 34, wherein the control and regulating device (24) is connected to a rotational speed actuating device, preferably to a power actuator on an internal combustion engine (1) of the motor vehicle via a control line (25).